



## ECONOMY AND ENVIRONMENT PROGRAM FOR SOUTHEAST ASIA

### POLICY BRIEF

## PRICING FOR INDUSTRIAL USE OF GROUND WATER IN MANILA, PHILIPPINES

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The rapid growth and urbanisation of the Philippines' National Capital Region (NCR) has resulted in increasing demand for water. Migration has compounded the problem. Today, NCR is faced with growing needs which have outpaced the capacity of the water agency - Metropolitan Waterworks and Sewerage Systems (MWSS) - to expand supply.

Unserved sectors have resorted to ground well construction and illegal connections to MWSS pipes. As a result, average annual groundwater withdrawals have consistently exceeded the recharge rate, lowering the water table by about 6-12 m/yr. Groundwater resources are also threatened by saltwater intrusion, contamination from pollutants, and eventual depletion. Thus, current extraction and utilization of a unit of these resources involves an opportunity cost - the value that can be gained in the future.

A study was conducted to estimate the marginal opportunity cost (MOC) involved in meeting the water requirements of the industrial sector, and determine the right mix of pricing, fiscal and regulatory instruments for efficient use of groundwater. The main water source for industries in Metro Manila is groundwater (80%). Only about 20% get MWSS-supplied water, and some must augment water requirements by buying water from private vendors/tankers.

An efficient policy equates the price of any commodity or service with the cost of producing an additional unit of it, or the *marginal cost*. Calculating MOC consists of finding the true cost of an action that results in the depletion or degradation of the resource. MOC has three components: the private or direct cost (MPC); the marginal user cost (MUC) or scarcity premium; and the marginal external cost (MEC).

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This study calculated the MOC of MWSS and compared it to the current water tariff charged by this agency. MWSS's MOC was also compared to two other options: the MOC of groundwater and the MOC of the combined use of groundwater and MWSS-supplied water, in order to evaluate the least-cost program. The study zone was divided into two areas. Area A had a high rate of total pumpage, low groundwater stocks and a recharge rate, and/or salt water intrusion. Area B had moderate pumpage rates and little salt water contamination.

The results show that the most expensive option is to continue using groundwater. This is due to additional external and depletion costs (P176.83/cu.m.). The lower-cost option between the fully groundwater-supplied option (Option 1) and fully MWSS-supplied option (Option 3) is the latter, using either the MWSS' water tariff (P18.41/cu.m.) or applying the MOC of water production (net of leakages) of MWSS (P82.67/cu.m.). The least-cost option is the conjunctive use of groundwater and MWSS-supplied water, using MWSS's water rate for the latter supply (Option 2 = P50.09-52.50/cu.m.).

Option 2, which requires controlling groundwater pumpage and then connecting to MWSS, may not be feasible in the immediate future. If the on-going and proposed projects of the MWSS proceed on schedule, then 96% of the projected population would be served in the year 2015. This scenario assumes new surface water sources as the main source of water. To prevent over-extraction by the private sector, MWSS could consider jointly operating all high-yielding private wells and incorporating them into a distribution system. An additional incentive to control the over extraction of groundwater would be for MWSS to improve its service to provide a reliable water supply 24 hours a day. Some recovery of groundwater levels has occurred over the last 10 years in the central part of Metro Manila from the availability of additional water from MWSS after the completion of Manila Water Supply Project II. Other than fixing broken pipes and meters, and going after illegal connections, the new concessionaires (of recent MWSS privatization) should also indicate their plans on how else they will meet the water requirements of Metro Manila, and the nearby provinces of Rizal, Cavite and Bulacan.

To lessen the social cost resulting from over-extraction of groundwater resources, the government (through the National Water Resources Bureau---NWRB) should implement the Control Area program which will regulate pumpage in areas where the threat of salt water intrusion and eventual depletion is high. Regulation of pumping rates require groundwater users to act in ways opposite to their self-interest unless they are informed of the consequences of their actions and the social costs involved.

Legal and command-and-control policies can be complemented by economic instruments, such as imposing charges equal to the estimated MOC corresponding to the use of groundwater. This will make firms internalize social costs, and provide a continuous incentive for firms to adjust production decisions; to utilize new technology and processes that conserve and recycle water; and to cut back on wastewater discharges. Requiring that all existing wells and pumps be inventoried and monitored, and enforcing a prohibition on pumping from unmetered wells would involve additional administrative costs for MWSS. Considering the state of groundwater mining, however, the establishment of a monitoring network is justified. Pump meter technology is well-developed and relatively inexpensive.



Another way to confirm the volume of water extracted from wells is through electric power consumption and verified pump production data. In addition, the tendency to tamper with the meters could be reduced by requiring the pumper to deposit a monetary bond sufficient to replace non-functioning meters.

Another instrument to be considered is a separate charge for wastewater and effluent discharges. This would serve as incentive for firms to treat wastes before discharging them or to recycle water and minimize both water consumption and total wastewater flows. Uncontrolled discharges have resulted in increased treatment cost for potable water supply, increased incidence of waterborne diseases, losses in fishery production, foregone use of certain water bodies for potable water supply sources, and amenities, among other problems. Expansion of the sewerage system is required while appropriate user fees can be imposed. The MOC of the sewerage system of the MWSS is P73.56/m.t.

The estimated demand for water by industries provides some evidence that firms do respond to increases in the price of water by reducing quantity demanded. The implementation of a pricing policy (which properly reflects opportunity costs), would have an economic impact – mainly on prices in the beverage industry and services sector - but its overall inflationary effect would be minimal.

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